Solve One-Variable Inequalities

Objective:
Solve one-step inequalities and graph the solution set.

Let's Review! Solve the following equations:

1. $14 = m - 7$
   $+7 \quad +7$
   $21 = m$

2. $12 = n + 2$
   $-2 \quad -2$
   $10 = n$

3. $\frac{32}{8} = \frac{8y}{8}$
   $4 = y$

4. $(5)\frac{r}{5} = 6(5)$ $\quad \frac{1}{5} r = 6$
   $r = 30$

Inequalities:

An inequality is two expressions separated by an inequality symbol.

The inequality symbols are $<$, $>$, $\leq$, $\geq$, and $\neq$.

Inequalities are also solved by using inverse operations.

$\{x \mid x < 2\}$ all numbers such that...

Solve the following inequalities:

5. $14 < m - 7$
   $+7 \quad +7$
   $21 < m$
   $\{m \mid 21 < m\}$
   $\{m \mid m > 21\}$

6. $12 \geq n + 2$
   $-2 \quad -2$
   $10 \geq n$
   $\{n \mid 10 \geq n\}$

7. $\frac{32}{8} \leq \frac{8y}{8}$
   $4 \leq y$
   $\{y \mid 4 \leq y\}$

8. $(5)\frac{r}{5} > 6(5)$
   $\{r \mid r > 30\}$

Try These:

9. $x - 3 \geq 5$

10. $x + 2 \leq 1$

11. $2x > 8$

12. $3x \leq 12$

13. $\frac{x}{2} < 4$

14. $\frac{2}{3}x \geq 4$

Solve One-Variable Inequalities

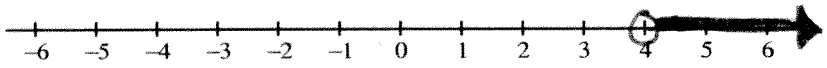
Graphing:

One variable inequalities will be graphed on a number line.

In $x > 4$, the boundary of your solution is 4, but 4 is not included in the solution set. The solution only includes numbers greater than 4.

In $x \leq 4$, the boundary of your solution is 4, and 4 is included in the solution set. The solution is 4 and every number less than 4.

$x > 4$



$x \leq 4$

- Use an open circle for $<$ and $>$.
- Use a filled-in circle for $\leq$ and $\geq$.
- Shade right for $>$ and $\geq$.
- Shade left for $<$ and $\leq$.

Additional Rules:

You must remember to reverse the inequality symbol whenever you:

- Reverse the symbol of an inequality.
- Multiply both sides by a negative.
- Divide both sides by a negative.

$2 \cdot 4 > 3 \cdot 2$

$8 \geq 6$

$-2 \cdot 4 > 3 \cdot -2$

$-8 \leq -6$

Switch the inequality symbol

Try These:

15. $\frac{-3x}{-3} \leq \frac{12}{-3}$

$\{x \mid x \geq -4\}$

16. $\frac{x}{-2} < 4(-2)$

$\{x \mid x > -8\}$

17. $5 \geq x - 3$

$+3 \quad +3$

$\{x \mid 8 \geq x\}$

18. $\frac{3x}{3} \leq \frac{-12}{3}$

$\{x \mid x \leq -4\}$

19. $\frac{x}{2} < -4(2)$

$\{x \mid x < -8\}$

20. $x + 2 \leq 1$

$-2 \quad -2$

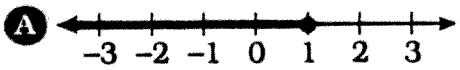
$\{x \mid x \leq -1\}$

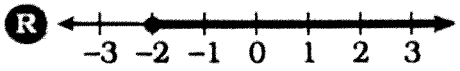
Where Do Airline Pilots Keep Their Uniforms?

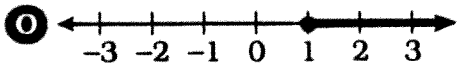
For each exercise, write the letter of the answer in the box containing the exercise number.

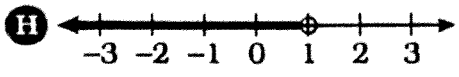
In Exercises 1-6, match the inequality with its graph.

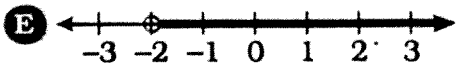
1. $x < 1$
2. $x \leq 1$
3. $x > -2$
4. $x \geq -2$
5. $-2 > x$
6. $1 \leq x$

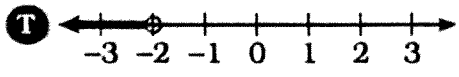
A 

R 

O 

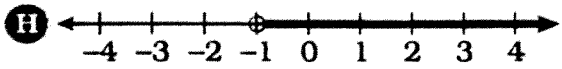
H 

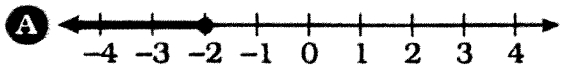
E 

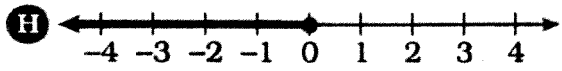
T 

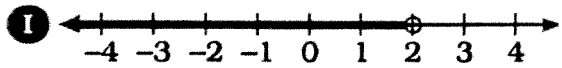
In Exercises 7-18, solve the inequality. Then graph the solution.

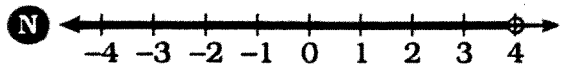
7. $4n + 1 < 9$
8. $7a - 2 \geq 5$
9. $3y + 10 \leq 4$
10. $8k - 3 > -27$
11. $\frac{x}{2} + 9 < 11$
12. $\frac{d}{6} - 4 \geq -5$
13. $\frac{u}{15} - 2 \leq -2$
14. $5p - 14 < 26$
15. $18 \leq 7b + 4$
16. $-9 < 12y + 3$
17. $-14 \geq \frac{x}{3} - 16$
18. $5 < \frac{m}{8} + 5$

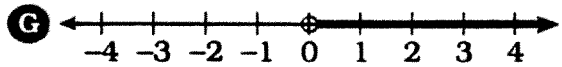
H 

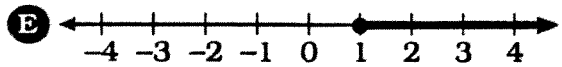
A 

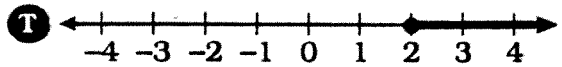
H 

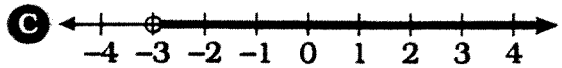
I 

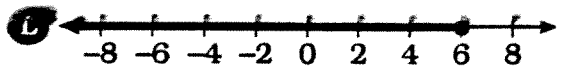
N 

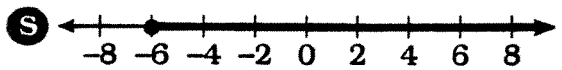
G 

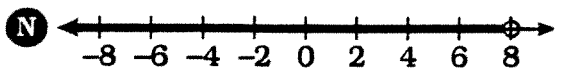
E 

T 

C 

L 

S 

N 

7	11	5	13	3	10	17	6	15	1	8	12	16	2	14	18	9	4

What Happens When the King of Beasts Runs in Front of a Train?

Draw a line connecting each inequality to the inequality for its solution set. The line will cross a number and a letter. Write the letter in the corresponding box at the bottom of the page.

1	$-5x + 2 \leq 37$	$x \geq -20$
2	$3x - 10 > -22$	$x < 96$
3	$-9x - 4 \geq 95$	$x > -80$
4	$\frac{x}{8} + 3 < 15$	$x < -54$
5	$-\frac{x}{6} + 11 > 20$	$x < -4$
6	$-\frac{1}{4}x - 1 \leq -9$	$x < 6$
7	$5 + 16x < -59$	$x > 96$
8	$\frac{1}{7}x + 2 \geq -11$	$x \geq -7$
9	$15 - 4x \leq 95$	$x > 21$
10	$\frac{2}{3}x - 20 > -6$	$x \geq -11$
11	$1 - \frac{5}{2}x \leq 16$	$x > -4$
12	$-4 + 11x \geq -125$	$x > -54$
13	$-12x - 5 > -77$	$x \geq 32$
14	$\frac{x}{27} + 10 > 8$	$x \leq 0$
15	$-4 - \frac{3}{8}x < 26$	$x \geq -6$
16	$13 - x \geq 33$	$x \leq -11$
17	$-\frac{1}{16}x + 5 < -1$	$x \leq -20$
18	$70x + 70 \leq 70$	$x \geq -91$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18